

CLAIMS

We Claim:

1. A packaged microelectromechanical device, comprising:
a deflectable element on a substrate;
a getter material and / or a lubricant material disposed on the substrate; and
a package having the substrate with the deflectable element.
2. The device of claim 1, wherein the substrate is glass substrate that is transmissive to visible light.
3. The device of claim 2, wherein the deflectable element is a mirror plate that is attached to a hinge formed on the substrate such that the mirror plate can rotate on the substrate.
4. The device of claim 1, wherein the substrate is a semiconductor substrate having thereon an electrode and circuitry for deflecting the deformable element.
5. The device of claim 1, wherein the package further comprises:
a package substrate having a cavity in which the substrate and the deflectable element is accommodated; and
a cover lid on the package substrate.
6. The device of claim 5, wherein the cover lid is glass that is transmissive to visible light.
7. The device of claim 5, wherein the cover lid has a window that passes visible light.
8. The device of claim 5, wherein the package substrate is a flat substrate that is bonded to the cover lid through a spacer disposed therebetween.
9. The device of claim 1, wherein the lubricant material is disposed on a surface around the circumference of the substrate.

10. The device of claim 1, wherein the lubricant material is disposed on a side –wall of the substrate.
11. The device of claim 1, wherein the lubricant is disposed in a capillary tubing formed on the substrate.
12. The device of claim 11, wherein the tubing has a size that is determined by a desired amount of lubricant.
13. The device of claim 11, wherein the tubing has an opening on a surface of substrate.
14. The device of claim 11, wherein the tubing has an opening on a side-wall of substrate.
15. The device of claim 1, wherein the lubricant is held by a container that is attached affixed to the substrate having the deflectable element.
16. The device of claim 1, wherein the lubricant is disposed in a trench on the substrate.
17. The device of claim 1, further comprising: a getter.
18. The device of claim 1, further comprising: a lubricant.
19. The device of claim 1, further comprising: a getter and a lubricant.
20. A microelectromechanical device, comprising:
 - a substrate;
 - a deflectable element attached to a deformable element held by the substrate; and
 - a carrier disposed on the substrate, wherein the carrier adsorbs a lubricant material that is operable for lubricating a surface of the device, said carrier is operable to desorb the adsorbed lubricant upon a variation of the environment in which the device is operated.

21. A packaged microelectromechanical device, comprising:
 - a deflectable element on a substrate;
 - a getter having a getter material disposed on the substrate;
 - a lubricant material that is carried by the getter; and
 - a package having the substrate with the deflectable element.
22. The device of claim 21, wherein the substrate is glass substrate that is transmissive to visible light.
23. The device of claim 22, wherein the deflectable element is a mirror plate that is attached to a hinge formed on the substrate such that the mirror plate can rotate on the substrate.
24. The device of claim 21, wherein the substrate is a semiconductor substrate having thereon an electrode and circuitry for deflecting the deformable element.
25. The device of claim 21, wherein the package further comprises:
 - a package substrate having a cavity in which the substrate and the deflectable element is accommodated; and
 - a cover lid on the package substrate.
26. The device of claim 25, wherein the cover lid is glass that is transmissive to visible light.
27. The device of claim 25, wherein the cover lid has a window that passes visible light.
28. The device of claim 25, wherein the package substrate is a flat substrate that is bonded to the cover lid through a spacer disposed therebetween.
29. The device of claim 21, wherein the lubricant material is disposed on a surface around the circumference of the substrate.

30. The device of claim 21, wherein the lubricant material is disposed on a side –wall of the substrate.
31. The device of claim 21, wherein the lubricant is disposed in a capillary tubing formed on the substrate.
32. The device of claim 31, wherein the tubing has a size that is determined by a desired amount of lubricant.
33. The device of claim 31, wherein the tubing has an opening on a surface of substrate.
34. The device of claim 31, wherein the tubing has an opening on a side-wall of substrate.
35. The device of claim 21, wherein the lubricant is held by a container that is attached affixed to the substrate having the deflectable element.
36. The device of claim 21, wherein the lubricant is disposed in a trench on the substrate.
37. The device of claim 21, further comprising: a getter.
38. The device of claim 21, further comprising: a lubricant.
39. The device of claim 21, further comprising: a getter and a lubricant.